EFFECT OF SODIUM NITRATE APPLIED AT DIFFERENT PERIODS OF THE GROWING SEASON ON THE YIELD, COMPOSITION, AND QUALITY OF WHEAT

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A SERIES of experiments beginning in 1916 (4, 5) showed that nitrates, as well as ammonium salts, increased the yield of wheat when applied at an early period of the vegetative stage, increased the protein content, and prevented “yellow berry” when applied at the time of heading, but had no effect either on yield or composition when applied at the “milk stage”. Similar results were obtained by Moertlbauer (10), Gericke (7), Neidig and Synder (11), and, more recently, by Selke (12).

In a later experiment (3) carried out at College Park, Md., it was shown that when the vegetative period (from resumption of growth in the spring until heading time) was divided into three arbitrary subperiods, the increase in yield, due to the application of nitrates, was directly related to the earliness of the respective subperiod, while the protein content of the grain was inversely related.

Results are reported here for experiments in which the entire wheat-growing season was divided into 14 periods, extending from the time of planting to the advanced “milk stage.”

EXPERIMENTAL PROCEDURE

The experiments were carried out on the Arlington Experimental Farm, Arlington, Va., in the crop year 1922–23. The size of the plots was 1/40 acre. The seed used was “Purple Straw”, a soft red winter wheat variety. Eight pounds of sodium nitrate (at the rate of 320 pounds per acre) were applied to each plot but on different dates. The first fall applications were made after the crop was up. The control plots received no fertilizer treatment. The wheat headed out between May 25 and 29. The experiments were run in duplicate series.

RESULTS

The yields of the entire crops (grain and straw) and of the grain, as well as the ratio of grain to straw, expressed as the percentage of grain in the entire crop, are given in Table 1.

In series 1, while there is considerable variation in yield, the differences could not be attributed with certainty to the sodium nitrate applications, owing to the high yields obtained from the control plots. In series 2, the early applications of sodium nitrate resulted in an increase of the entire crop (grain and straw) and, if the second control plot be disregarded, also in an increase in the yield of grain. The differences in the yield in series 1 may have been due to differences in the soil, as many plots or sections on the Arlington Farm lacked uniformity owing to artificial origin and to treatment received in pre-